

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 06-313962

(43)Date of publication of application : 08.11.1994

(51)Int.Cl.

G03F 1/00  
H04N 1/387

(21)Application number : 05-102416

(71)Applicant : DAINIPPON SCREEN MFG CO LTD

(22)Date of filing : 28.04.1993

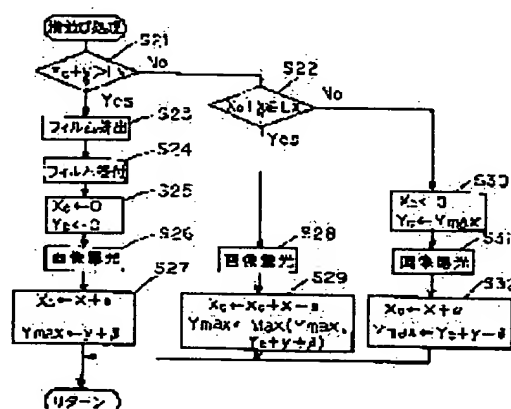
(72)Inventor : MITSUKI KIYOOMI

## (54) IMAGE RECORDER

## (57)Abstract:

PURPOSE: To record plural images on a recording medium limited in size with good spatial efficiency.

CONSTITUTION: An output machine is a device for successively recording plural images on a photosensitive film. When the arraying direction of the image on the photosensitive film is designated from a control panel, in this recorder, the recording start position  $P(X_c, Y_c)$  of the image is decided based on the designated arraying direction (horizontal arrangement or vertical arrangement) and the recording size  $(x, y)$  of the image. Then, the image is recorded from a decided recording start position by an exposing part.



## LEGAL STATUS

[Date of request for examination]

02.12.1996

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than abandonment  
the examiner's decision of rejection or  
application converted registration]

[Date of final disposal for application]

18.08.1998

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision  
of rejection][Date of requesting appeal against examiner's  
decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

## \* NOTICES \*

IPO and NCIP I are not responsible for any  
damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

CLAIMS

---

[Claim(s)]

[Claim 1] An array direction acquisition means to acquire the array direction on said record medium of said image in the image recording equipment which records two or more images on a record medium one by one, image recording equipment equipped with a starting position decision means by which the array direction acquired by said array direction acquisition means and the record size of said image determine the recording start location of each image, and a record means to record said image from the recording start location determined with said starting position decision means.

---

[Translation done.]

\* NOTICES \*

JPO and NCIPJ are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

DETAILED DESCRIPTION

---

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to image recording equipment and the image recording equipment which records two or more images on a record medium one by one especially.

[0002]

[Description of the Prior Art] The image recording equipment for platemaking called an imagesetter and an output scanner carries out sequential exposure record of two or more images at the sensitive film (it is only hereafter described as a film) which is a record medium. Since two or more of these images have various record size, if the record location of each image is not determined taking the record size of two or more images into consideration, its field by which image formation is not carried out will increase, consequently its useless part of a film will increase.

[0003] Then, it is possible to prepare the memory which can record image data on image recording equipment in large quantities, to once memorize two or more image data in the memory, and to record an image one by one according to the record location which determined the record location of the image of these plurality with the record size of image data, and was determined after that. However, since a record location cannot be determined unless the size of two or more images of all is known required [ mass memory ], this takes long duration by the recording start.

[0004] For this reason, with conventional image recording equipment, the image formation field of a film is divided into an one direction, and two or more images are arranged and recorded one by one along that division field. That is, the array direction of the record image to a film is fixed, it meets in the array direction, and the image is assigned one by one.

[0005]

[Problem(s) to be Solved by the Invention] However, with conventional image recording equipment, since the array direction of a record image was being fixed, the non-record sections by which image formation is not carried out depending on the record size of an image may increase in number, and a film may become useless. for example, it is shown in drawing 8 -- as -- two or more image data I1-I8 -- if the record size of each one direction (for example, the main scanning direction Y) is almost the same, and the sequential record images I1-I8 are arranged to a main scanning direction Y as shown in drawing 9 when the size of the other directions (for example, the direction X of vertical scanning) is various, the non-record section shown by hatching to the service area EA of a film will become large, and a useless part will increase. Therefore, only six images I1-I6 can be recorded on the film of one sheet, but the two remaining images I7-I8 must be recorded on the following film. For this reason, a film is consumed vainly.

[0006] When recording the image of size as shown in drawing 8, as shown in drawing 10, the non-record section which the way which arranges images I1-I8 in the direction X of vertical scanning shows by hatching, i.e., the useless part of a film, decreases, and all the images I1-I8 can be recorded on the film of one sheet. In case the purpose of this invention records two or more images on the record medium with which magnitude was limited, it is to enable it to use a record medium effectively without futility.

[0007]

[Means for Solving the Problem] The image recording equipment concerning this invention is equipment which records two or more images on a record medium one by one, and is equipped with the array direction acquisition means, the starting position decision means, and the record means. The array direction acquisition means acquires the array direction on said record medium of an image. A starting position decision means determines

the recording start location of an image with the array direction and the record size of an image which were obtained by the array direction acquisition means. A record means records an image from the recording start location determined with the starting position decision means.

[0008]

[Function] With the image recording equipment concerning this invention, if the array direction on said record medium of an image is acquired by the array direction acquisition means in case two or more images are recorded on a record medium one by one, a starting position decision means will determine the recording start location of an image with the array direction and the record size of an image which were obtained. And a record means records an image from the recording start location determined with the starting position decision means.

[0009] Here, since the array direction of an image is acquired, an image starting position is defined according to the array direction and the record size of an image which were obtained and an image is recorded on a record medium, an image can be efficiently arranged to the record medium with which magnitude was limited, and the useless part of a record medium can be lessened.

[0010]

[Example]

The block diagram 1 of image recording equipment shows the output machine 50 for the platemaking as image recording equipment by one example of this invention. The output machine 50 mainly has the box-like body case 51, the film feed zone 52 arranged at the tooth-back side (drawing 1 near side) of the body case 51, and the exposure section 53 which exposes the film supplied from the film feed zone 52, and records an image on a film. The configuration exposure section 53 of the exposure section consists of an exposure head 3 which exposes the cylinder 1 which equips a peripheral face with the supplied film 2, the motor 12 which carries out the rotation drive of the cylinder 1 in a main scanning direction Y, and the film 2 held at the cylinder 1 with the light according to image data, and a head migration device 15 in which the exposure head 3 is driven in the direction X of vertical scanning, as shown in drawing 2. Between the cylinder 1 and the film feed zone 52, the film attachment-and-detachment device which is not illustrated is arranged. A film attachment-and-detachment device performs supply and discharge of the film to a cylinder 1.

[0011] The exposure head 3 consists of movable carriages 7 to which the zoom lens 5, and LED array 4 and zoom lens 5 for carrying out image formation of the image of the light emitting device of LED array 4 which has two or more light emitting devices, and LED array 4 to a film 2 are being fixed. The head migration device 15 consists of a motor 10, a ball thread 8 by which a rotation drive is carried out by the motor 10, one pair of rails 9 (only one side is illustrated) arranged in parallel with the direction X of vertical scanning, and a ball nut (not shown) which it is fixed to a movable carriage 7 and screwed in a ball thread 8. The migration device 15 moves the exposure head 3 in the direction X of vertical scanning by driving a motor 10.

[0012] Motors 10 and 12 output the encoder signals EX and EY from the encoders 11 and 13 which drive control was carried out in response to driving signals VX and VY, and were formed in each. The encoder signals EX and EY show the X coordinate of the exposure location by the exposure head 3, and Y coordinate, respectively. An image can be exposed to the effective image field 20 of a film 2 by carrying out luminescence control of LED array 4 by the above configuration, based on image data, while a cylinder 1 rotates to a main scanning direction Y and the exposure head 3 moves in the direction X of vertical scanning by the motor 10 from a motor 12. In addition, the film 2 with which the image was exposed is developed by the developing machine (not shown). The control-block Fig. of the output machine 50 is shown in the block diagram 3 of the control section of an output machine.

[0013] The output machine 50 records image data IM outputted from the system 60 which consists of an image reader or an image database on a film 2. This image data IM is expressed in the raster format. Moreover, the output machine 50 and the system 60 are connected through the interface 40. The output machine 50 has CPU30 for control. RAM31, ROM32, and an interface 40 are connected to CPU30 through the system bus 36, and CPU30 controls each load based on the control program stored in the various data and ROM32 which were stored in RAM31.

[0014] in addition, the various data stored in RAM31 are the spacing alpha of the direction of vertical scanning of the array direction \*\*\*\* LAYOUT flag "time it is lining up side-by-side -- the time of "H" and a vertical list -- V" of the record image inputted from a control panel 33, and a record image, the spacing beta of the main scanning direction of a record image, the recording start position coordinate P (Xc, Yc), and the exposure position coordinate Q of the exposure head 3 (Xh, Yh). Here, that an operator should just set up according to the size of an image, the array direction of an image should just choose the array of the direction of vertical

scanning, when the size of the main scanning direction of two or more record images has gathered, and the size of the direction of vertical scanning has, on the other hand, gathered the array of the direction of vertical scanning. Moreover, it cuts and carries out, spacing of  $\alpha$  is shown, and spacing  $\alpha$  and spacing  $\beta$  can be set [ required in order to separate two or more images recorded on the film 2 of one sheet, respectively ] as adjustable by the operator. Moreover, the coordinate P of a recording start point is set up by the operation mentioned later, and the exposure position coordinate Q is always detected by the encoder signals EX and EY from encoders 11 and 13.

[0015] Each load which CPU30 controls is with the memory control section 41 and the LED mechanical component 43 which were connected through the system bus 36, and the motors 10 and 12 connected through a system bus 36 and each driver 35. The memory control section 41 performs control for writing image data IM inputted through an interface 40 from a system 60 in image memory 42, and control for reading image data IM from image memory 42, and outputting to the LED mechanical component 43. The LED mechanical component 42 controls luminescence of LED array 4 according to image data IM outputted from the memory control section 41. Moreover, a control panel 33 and encoders 11 and 13 are also connected to CPU30 through each interface 34 and system bus 36.

[0016] Thus, CPU30 outputs driving signals VX and VY to motors 10 and 12, respectively, and carries out drive control of each motors 10 and 12, and controls the memory control section 41 and the LED mechanical component 43.

outline actuation — by such configuration, if the size x of the direction of vertical scanning of image data and the size y of a main scanning direction are received from a system 60, CPU30 will determine the recording start point P of an image by the array direction of the record image set up beforehand, and this size x and y, and it will drive motors 10 and 12 so that the exposure location Q of the exposure head 3 may be located in this recording start point P. And an image is exposed in the location determined by carrying out luminescence control of LED array 4 based on image data IM.

The example of allotment in the case of arranging and recording two or more images with which record sizes differ in the direction X of vertical scanning on allotment drawing 4 of a record image is shown.

[0017] The image data of two or more images by which a sequential output is carried out from a system 60 here IM (n) It  $x_n(s)$ . (— however,  $n =$  — the size of the direction of vertical scanning of 1, 2, —), and image data IM (n) Spacing of the main scanning direction of  $\alpha$  and an adjoining record image is set to  $\beta$  for spacing of the direction of vertical scanning of the record image which L(ies) and adjoins [ size / of  $L_x$  and a main scanning direction ] the size of a main scanning direction in the size of the direction of vertical scanning of  $y_n$  and the effective image field of a film 2.

[0018] The record image RIM (1) based on image data IM (1) is the recording start point P1 about a zero (0 0). The field carried out is exposed. The record image RIM (2) based on following image data IM (2) is the recording start point P2. Although the field shown is exposed, the Y coordinate of the recording start point P2 is the recording start point P1 here. It is the same and X coordinate is the size  $x_1$  of the direction X of vertical scanning of image data IM (1). It is the point shifted by the coordinate of having added spacing  $\alpha$ . Namely,  $P_2 : (x_1 + \alpha, 0)$

It becomes. Consequently, only distance  $\alpha$  leaves spacing of the direction X of vertical scanning of the record image RIM (1) and the record image RIM (2).

[0019] Next, since the free area of the 1st horizontal-scanning field R1 is small, the record image RIM (3) based on image data IM (3) is recorded on the next 2nd horizontal-scanning field R2. Here in the m-th horizontal-scanning field Rm (m is a positive integer) It is the field which the record image with the same coordinate of the main scanning direction Y of the recording start point P is formed, and is divided by the parting line parallel to the direction of vertical scanning. In the case of drawing 4, the 1st horizontal-scanning field R1 It is the field where the 2nd horizontal-scanning field R2 contains the record image RIM (3), RIM (4), and RIM (5), including the record image RIM (1) and RIM (2). Therefore, recording start point P3  $P_3 : (0 \ Y_{\max}(1)) = (0 \ y_1 + \beta)$  Here, spacing  $\beta$  is added to the maximum coordinate of the main scanning direction in all the record image fields recorded on the 1st horizontal-scanning field R1 with  $Y_{\max}(1)$ , and the main maximum coordinate is called hereafter. This is for vacating spacing  $\beta$  at least between the record images of the 1st horizontal-scanning field R1 and the 2nd horizontal-scanning field R2.

[0020] the following — the same — carrying out — the recording start point P4 of the image data of image data IM (4) and IM (5), and P5  $P_4 : (x_3 + \alpha, y_1 + \beta)$   
 $P_5 : (x_3 + x_4 + 2 \text{ and } \alpha, y_1 + \beta)$

It becomes. Furthermore, when recording image data IM (6) on this film 2, if the formula of  $Ly - Y_{max}(2) \geq y_6$  is filled, it can record on the 3rd horizontal-scanning field R3, but since it is unrecordable in an effective image field if not filled, it records on the new film 2.

The processing flow which starts one example of this invention at processing flow drawing 5 is shown. This processing flow shows the contents of the control program stored in ROM32.

[0021] First, initial setting is performed at step S1. Here, a LAYOUT flag is arranged at "stable ranking and hierarchy (H)", and the exposure head 3 and a cylinder 1 are arranged at a zero. Moreover, the recording start point P ( $X_c, Y_c$ ) is set as a zero (0 0). At step S2, the array direction (LAYOUT) of the spacing alpha of the direction X of vertical scanning between adjoining record images, the spacing beta of a main scanning direction Y, and the record image which were inputted from the control panel 33 is received, and the received data are stored in RAM31.

[0022] The film feed zone 52 and a film attachment-and-detachment device are controlled by step S3, and a cylinder 1 is equipped with a film 2 at it. In step S4, when it judges whether there was any input of discharge of a film 2 of directions from a control panel 33 and there are directions of discharge of a film 2, it shifts to step S5, a film 2 is discharged from a cylinder 1, and this processing flow is ended.

[0023] When there are no discharge directions of a film 2, it shifts to step S6 from step S4. It waits for directions of the image recording from a system 60 at step S6. When it is judged that there were directions of the image recording from a system 60, it shifts to step S7 and the size x of the direction of vertical scanning of image data IM and the size y of a main scanning direction are received from a system 60. At step S8, in stable-ranking (direction array of vertical scanning) processing (LAYOUT flag = "H"), the array direction of a record image is shifted to step S9 with reference to the LAYOUT flag of RAM31, in vertical list (main scanning direction array) processing (LAYOUT flag = "V"), it shifts to step S10, and it performs image recording. After these processings finish, it waits for return, discharge directions of a film, or directions of the following image recording to step S4.

[0024] The detail of the lining-up-side-by-side processing flow of step S9 is shown in drawing 6. First, a recording start location judges whether in which case of the following three cases, it corresponds at steps S21 and S22. these three cases -- \*\* -- the case where an image is recorded on the following film.

\*\* When an image is recorded on a different horizontal-scanning field from said image transcription image.

[0025] \*\* When an image is recorded on the same horizontal-scanning field as said image transcription image. coming out -- it is -- formula the case where  $Y_c + y > Ly$  is filled -- the case (step S21 is Yes) of \*\*, and formula  $Y_c + y \leq Ly$  -- and -- the case where  $X_c + x > Lx$  is filled -- the case (for step S21, No and step S22 are No) of \*\*, and formula  $Y_c + y \leq Ly$  -- and -- When filling  $X_c + x \leq Lx$ , it is judged as the case (step S22 is Yes) of \*\*, respectively. It is the coordinate location of the recording start point P at the time of assuming that an image is recorded on the horizontal-scanning field as the record image recorded last time where  $X_c$  and  $Y_c$  are the same here.

[0026] \*\* a case -- the present and a cylinder 1 -- equipping -- having -- \*\*\*\* -- a film -- two -- \*\*\*\* -- a free area -- being few -- since -- a degree -- in order to record on a film, shift to step S23 from step S21, discharge the film 2 with which the cylinder 1 is equipped, and equip a cylinder 1 with the new film 2 at step S24. Furthermore, at step S25, the recording start point P is changed into a zero, and step S26 performs image exposure. Next, at step S27, the following record image sets up X coordinate  $X_c$  of the recording start point P, assuming that it is recorded on the same horizontal-scanning field as the record image recorded at this step S26 (making  $X_c$  into  $x + \alpha$ ), and makes the main maximum coordinate  $Y_{max} + y + \beta$  further. However, Y coordinate  $Y_c$  of the recording start point P does not need to change.

[0027] \*\* a case -- last time -- recording -- having had -- record -- an image -- containing -- having -- horizontal scanning -- a field -- \*\*\*\* -- a free area -- being few -- since -- a degree -- in order to record on a horizontal-scanning field, shift to step S30 from step S22, set the recording start point P as a point (0  $Y_{max}$ ), and perform image exposure at step S31. Here, the main maximum coordinate  $Y_{max}$  is the value which added spacing beta to the maximum coordinate of the main scanning direction of the record image of a pre-horizontal-scanning field. Next, at step S32, the following image sets up X coordinate  $X_c$  of the recording start point P, assuming that it is recorded on the same horizontal-scanning field as the record image recorded at this step S31 ( $X_c$  is made into  $x + \alpha$ ), and makes the main maximum coordinate  $Y_{max} + y + \beta$  further. However, it is not necessary to change Y coordinate  $Y_c$  of the recording start point P like the case of \*\*.

[0028] \*\* a case -- last time -- recording -- having had -- record -- an image -- containing -- having -- horizontal scanning -- a field -- being the same -- horizontal scanning -- a field -- recording -- a sake -- step

-- shift to step S28 from 22, and perform image exposure by making a coordinate ( $X_c$ ,  $Y_c$ ) into the recording start point P as it is. Next, X coordinate  $X_c$  of the following recording start point P is set up, assuming that it is recorded on the same horizontal-scanning field as the record image with which the following image was recorded at this step S29 at step S29 ( $X_c$  is made into  $X_c + x + \alpha$ ), and what added spacing beta to the maximum coordinate of a main scanning direction among all the record images of this horizontal-scanning field is further set up as the main maximum coordinate  $Y_{max}$ .

[0029] The detail of the vertical list processing flow of step S10 is shown in drawing 7. Vertical list processings are step S41 - step S52, perform processing of step S21 - step S32 lining up side-by-side, and same processing, and replace the X coordinate and Y coordinate in a lining-up-side-by-side processing flow. Here, a recording start location judges whether in which case of the following three cases, it corresponds at steps S41 and S42. these three cases -- \*\* -- the case where an image is recorded on the following film.

[0030] \*\* When an image is recorded on a different vertical-scanning field from said image transcription image.

\* When an image is recorded on the same vertical-scanning field as said image transcription image.

Coming out -- it is -- formula the case where  $X_c + x > L_x$  is filled -- the case (step S41 is Yes) of \*\*, and formula  $(c + x) \leq L_x$  -- and -- the case where  $Y_c + y > L_y$  is filled -- the case (for step S41, No and step S42 are No) of \*\*, and formula  $X_c + x \leq L_x$  -- and -- When filling  $Y_c + y \leq L_y$ , it is judged as the case (step S42 is Yes) of \*\*, respectively.

[0031] \*\* a case -- step S -- shift to step S43 from 41, discharge the film 2 with which the cylinder 1 is equipped like the case of \*\* in a lining-up-side-by-side processing flow, and equip a cylinder 1 with the new film 2 at step S44. Furthermore, at step S45, the recording start point P is changed into a zero, and step S46 performs image exposure. Next, at step S47, the following image sets Y coordinate  $Y_c$  of the recording start point P as  $y + \beta$ , assuming that it is recorded on the same vertical-scanning field as the record image recorded at this step S46, and makes  $X_{max}$   $x + \alpha$  further. Here,  $X_{max}$  is equivalent to the main maximum coordinate  $Y_{max}$  at the time of processing lining up side-by-side, and calls the submaximum coordinate hereafter.

[0032] \*\* a case -- step S -- shift to step S50 from 42, set the recording start point P as a point ( $X_{max}$ , 0) like the case of \*\* in a lining-up-side-by-side processing flow, and perform image exposure at step S51. Here, the submaximum coordinate  $X_{max}$  is the value which added spacing alpha to the maximum coordinate of the direction of vertical scanning of the record image of a pre-vertical-scanning field. Next, at step S52, the following image sets Y coordinate  $Y_c$  of the recording start point P as  $y + \beta$ , assuming that it is recorded on the same vertical-scanning field as the record image recorded at this step S51, and makes the submaximum coordinate  $X_{max}$   $X_c + x + \alpha$  further.

[0033] \*\* a case -- step S -- shift to step S48 from 42, and perform image exposure by making a coordinate ( $X_c$ ,  $Y_c$ ) into the recording start point P as it is like the case of \*\* in a lining-up-side-by-side processing flow. Next, at step S49, it assumes that the following image is recorded on the same vertical-scanning field, the coordinate ( $X_c$ ,  $Y_c$ ) of the recording start point P is set up, and what added spacing alpha to the maximum coordinate of the direction of vertical scanning among the record images of this vertical-scanning field is further set up as the submaximum coordinate  $X_{max}$ . Example] besides [ In said example, although this invention was applied to the output machine for platemaking, this invention is applicable to other image recording equipments, such as an image output unit for the mask patterns of the printed circuit board which records two or more images.

[0034]

[Effect of the Invention] Since the array direction of an image is acquired, an image starting position is defined according to the array direction and the record size of an image which were obtained and an image is recorded on a record medium, an image is recordable with the image recording equipment concerning this invention without futility to the record medium with which magnitude was limited, as explained above.

---

[Translation done.]



\* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

TECHNICAL FIELD

---

[Industrial Application] This invention relates to image recording equipment and the image recording equipment which records two or more images on a record medium one by one especially.

---

[Translation done.]

**\* NOTICES \***

JPO and NCIPJ are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

**PRIOR ART**

[Description of the Prior Art] The image recording equipment for platemaking called an imagesetter and an output scanner carries out sequential exposure record of two or more images at the sensitive film (it is only hereafter described as a film) which is a record medium. Since two or more of these images have various record size, if the record location of each image is not determined taking the record size of two or more images into consideration, its field by which image formation is not carried out will increase, consequently its useless part of a film will increase.

[0003] Then, it is possible to prepare the memory which can record image data on image recording equipment in large quantities, to once memorize two or more image data in the memory, and to record an image one by one according to the record location which determined the record location of the image of these plurality with the record size of image data, and was determined after that. However, since a record location cannot be determined unless the size of two or more images of all is known required [ mass memory ], this takes long duration by the recording start.

[0004] For this reason, with conventional image recording equipment, the image formation field of a film is divided into an one direction, and two or more images are arranged and recorded one by one along that division field. That is, the array direction of the record image to a film is fixed, it meets in the array direction, and the image is assigned one by one.

---

[Translation done.]

\* NOTICES \*

JPO and NCIPJ are not responsible for any  
damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

EFFECT OF THE INVENTION

---

[Effect of the Invention] Since the array direction of an image is acquired, an image starting position is defined according to the array direction and the record size of an image which were obtained and an image is recorded on a record medium, an image is recordable with the image recording equipment concerning this invention without futility to the record medium with which magnitude was limited, as explained above.

---

[Translation done.]

\* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

TECHNICAL PROBLEM

---

[Problem(s) to be Solved by the Invention] However, with conventional image recording equipment, since the array direction of a record image was being fixed, the non-record sections by which image formation is not carried out depending on the record size of an image may increase in number, and a film may become useless. for example, it is shown in drawing 8 — as — two or more image data I1-I8 — if the record size of each one direction (for example, the main scanning direction Y) is almost the same, and the sequential record images I1-I8 are arranged to a main scanning direction Y as shown in drawing 9 when the size of the other directions (for example, the direction X of vertical scanning) is various, the non-record section shown by hatching to the service area EA of a film will become large, and a useless part will increase. Therefore, only six images I1-I6 can be recorded on the film of one sheet, but the two remaining images I7-I8 must be recorded on the following film. For this reason, a film is consumed vainly.

[0006] When recording the image of size as shown in drawing 8 , as shown in drawing 10 , the non-record section which the way which arranges images I1-I8 in the direction X of vertical scanning shows by hatching, i.e., the useless part of a film, decreases, and all the images I1-I8 can be recorded on the film of one sheet. In case the purpose of this invention records two or more images on the record medium with which magnitude was limited, it is to enable it to use a record medium effectively without futility.

---

[Translation done.]

**\* NOTICES \***

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

**MEANS**

---

[Means for Solving the Problem] The image recording equipment concerning this invention is equipment which records two or more images on a record medium one by one, and is equipped with the array direction acquisition means, the starting position decision means, and the record means. The array direction acquisition means acquires the array direction on said record medium of an image. A starting position decision means determines the recording start location of an image with the array direction and the record size of an image which were obtained by the array direction acquisition means. A record means records an image from the recording start location determined with the starting position decision means.

---

[Translation done.]

\* NOTICES \*

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

OPERATION

---

[Function] With the image recording equipment concerning this invention, if the array direction on said record medium of an image is acquired by the array direction acquisition means in case two or more images are recorded on a record medium one by one, a starting position decision means will determine the recording start location of an image with the array direction and the record size of an image which were obtained. And a record means records an image from the recording start location determined with the starting position decision means. [0009] Here, since the array direction of an image is acquired, an image starting position is defined according to the array direction and the record size of an image which were obtained and an image is recorded on a record medium, an image can be efficiently arranged to the record medium with which magnitude was limited, and the useless part of a record medium can be lessened.

---

[Translation done.]

**\* NOTICES \***

JPO and NCIPJ are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

**EXAMPLE**

---

**[Example]**

The block diagram 1 of image recording equipment shows the output machine 50 for the platemaking as image recording equipment by one example of this invention. The output machine 50 mainly has the box-like body case 51, the film feed zone 52 arranged at the tooth-back side ( drawing 1 near side) of the body case 51, and the exposure section 53 which exposes the film supplied from the film feed zone 52, and records an image on a film. The configuration exposure section 53 of the exposure section consists of an exposure head 3 which exposes the cylinder 1 which equips a peripheral face with the supplied film 2, the motor 12 which carries out the rotation drive of the cylinder 1 in a main scanning direction Y, and the film 2 held at the cylinder 1 with the light according to image data, and a head migration device 15 in which the exposure head 3 is driven in the direction X of vertical scanning, as shown in drawing 2 . Between the cylinder 1 and the film feed zone 52, the film attachment-and-detachment device which is not illustrated is arranged. A film attachment-and-detachment device performs supply and discharge of the film to a cylinder 1.

[0011] The exposure head 3 consists of movable carriages 7 to which the zoom lens 5, and LED array 4 and zoom lens 5 for carrying out image formation of the image of the light emitting device of LED array 4 which has two or more light emitting devices, and LED array 4 to a film 2 are being fixed. The head migration device 15 consists of a motor 10, a ball thread 8 by which a rotation drive is carried out by the motor 10, one pair of rails 9 (only one side is illustrated) arranged in parallel with the direction X of vertical scanning, and a ball nut (not shown) which it is fixed to a movable carriage 7 and screwed in a ball thread 8. The migration device 15 moves the exposure head 3 in the direction X of vertical scanning by driving a motor 10.

[0012] Motors 10 and 12 output the encoder signals EX and EY from the encoders 11 and 13 which drive control was carried out in response to driving signals VX and VY, and were formed in each. The encoder signals EX and EY show the X coordinate of the exposure location by the exposure head 3, and Y coordinate, respectively. An image can be exposed to the effective image field 20 of a film 2 by carrying out luminescence control of LED array 4 by the above configuration, based on image data, while a cylinder 1 rotates to a main scanning direction Y and the exposure head 3 moves in the direction X of vertical scanning by the motor 10 from a motor 12. In addition, the film 2 with which the image was exposed is developed by the developing machine (not shown). The control-block Fig. of the output machine 50 is shown in the block diagram 3 of the control section of an output machine.

[0013] The output machine 50 records image data IM outputted from the system 60 which consists of an image reader or an image database on a film 2. This image data IM is expressed in the raster format. Moreover, the output machine 50 and the system 60 are connected through the interface 40. The output machine 50 has CPU30 for control. RAM31, ROM32, and an interface 40 are connected to CPU30 through the system bus 36, and CPU30 controls each load based on the control program stored in the various data and ROM32 which were stored in RAM31.

[0014] in addition, the various data stored in RAM31 are the spacing alpha of the direction of vertical scanning of the array direction \*\*\*\* LAYOUT flag "time it is lining up side-by-side -- the time of "H" and a vertical list -- V" of the record image inputted from a control panel 33, and a record image, the spacing beta of the main scanning direction of a record image, the recording start position coordinate P (Xc, Yc), and the exposure position coordinate Q of the exposure head 3 (Xh, Yh). Here, that an operator should just set up according to the size of an image, the array direction of an image should just choose the array of the direction of vertical scanning, when the size of the main scanning direction of two or more record images has gathered, and the size of the direction of vertical scanning has, on the other hand, gathered the array of the direction of vertical

scanning. Moreover, it cuts and carries out, spacing of \*\* is shown, and spacing alpha and spacing beta can be set [ required in order to separate two or more images recorded on the film 2 of one sheet, respectively ] as adjustable by the operator. Moreover, the coordinate P of a recording start point is set up by the operation mentioned later, and the exposure position coordinate Q is always detected by the encoder signals EX and EY from encoders 11 and 13.

[0015] Each load which CPU30 controls is with the memory control section 41 and the LED mechanical component 43 which were connected through the system bus 36, and the motors 10 and 12 connected through a system bus 36 and each driver 35. The memory control section 41 performs control for writing image data IM inputted through an interface 40 from a system 60 in image memory 42, and control for reading image data IM from image memory 42, and outputting to the LED mechanical component 43. The LED mechanical component 42 controls luminescence of LED array 4 according to image data IM outputted from the memory control section 41. Moreover, a control panel 33 and encoders 11 and 13 are also connected to CPU30 through each interface 34 and system bus 36.

[0016] Thus, CPU30 outputs driving signals VX and VY to motors 10 and 12, respectively, and carries out drive control of each motors 10 and 12, and controls the memory control section 41 and the LED mechanical component 43.

outline actuation — by such configuration, if the size x of the direction of vertical scanning of image data and the size y of a main scanning direction are received from a system 60, CPU30 will determine the recording start point P of an image by the array direction of the record image set up beforehand, and this size x and y, and it will drive motors 10 and 12 so that the exposure location Q of the exposure head 3 may be located in this recording start point P. And an image is exposed in the location determined by carrying out luminescence control of LED array 4 based on image data IM.

The example of allotment in the case of arranging and recording two or more images with which record sizes differ in the direction X of vertical scanning on allotment drawing 4 of a record image is shown.

[0017] The image data of two or more images by which a sequential output is carried out from a system 60 here IM (n) It  $x_n(s)$ . (— however,  $n =$  — the size of the direction of vertical scanning of 1, 2, —), and image data IM (n) Spacing of the main scanning direction of alpha and an adjoining record image is set to beta for spacing of the direction of vertical scanning of the record image which L(ies) and adjoins [ size / of  $L_x$  and a main scanning direction ] the size of a main scanning direction in the size of the direction of vertical scanning of  $y_n$  and the effective image field of a film 2.

[0018] The record image RIM (1) based on image data IM (1) is the recording start point P1 about a zero (0 0). The field carried out is exposed. The record image RIM (2) based on following image data IM (2) is the recording start point P2. Although the field shown is exposed, the Y coordinate of the recording start point P2 is the recording start point P1 here. It is the same and X coordinate is the size  $x_1$  of the direction X of vertical scanning of image data IM (1). It is the point shifted by the coordinate of having added spacing alpha. Namely,  $P2 : (x_1 + \alpha, 0)$

It becomes. Consequently, only distance alpha leaves spacing of the direction X of vertical scanning of the record image RIM (1) and the record image RIM (2).

[0019] Next, since the free area of the 1st horizontal-scanning field R1 is small, the record image RIM (3) based on image data IM (3) is recorded on the next 2nd horizontal-scanning field R2. Here in the m-th horizontal-scanning field  $R_m$  (m is a positive integer) It is the field which the record image with the same coordinate of the main scanning direction Y of the recording start point P is formed, and is divided by the parting line parallel to the direction of vertical scanning. In the case of drawing 4, the 1st horizontal-scanning field R1 It is the field where the 2nd horizontal-scanning field R2 contains the record image RIM (3), RIM (4), and RIM (5), including the record image RIM (1) and RIM (2). Therefore, recording start point P3  $P3 : (0 \ Y_{max}(1)) = (0 \ y_1 + \beta)$

Here, spacing beta is added to the maximum coordinate of the main scanning direction in all the record image fields recorded on the 1st horizontal-scanning field R1 with  $Y_{max}(1)$ , and the main maximum coordinate is called hereafter. This is for vacating spacing beta at least between the record images of the 1st horizontal-scanning field R1 and the 2nd horizontal-scanning field R2.

[0020] the following — the same — carrying out — the recording start point P4 of the image data of image data IM (4) and IM (5), and P5  $P4 : (x_3 + \alpha, y_1 + \beta)$

$P5 : (x_3 + x_4 + 2 \text{ and } \alpha, y_1 + \beta)$

It becomes. Furthermore, when recording image data IM (6) on this film 2, if the formula of  $L_y - Y_{max}(2) \geq y_6$  is filled, it can record on the 3rd horizontal-scanning field R3, but since it is unrecordable in an effective image field



if not filled, it records on the new film 2.

The processing flow which starts one example of this invention at processing flow drawing 5 is shown. This processing flow shows the contents of the control program stored in ROM32.

[0021] First, initial setting is performed at step S1. Here, a LAYOUT flag is arranged at "stable ranking and hierarchy (H)", and the exposure head 3 and a cylinder 1 are arranged at a zero. Moreover, the recording start point P ( $X_c$ ,  $Y_c$ ) is set as a zero (0 0). At step S2, the array direction (LAYOUT) of the spacing alpha of the direction X of vertical scanning between adjoining record images, the spacing beta of a main scanning direction Y, and the record image which were inputted from the control panel 33 is received, and the received data are stored in RAM31.

[0022] The film feed zone 52 and a film attachment-and-detachment device are controlled by step S3, and a cylinder 1 is equipped with a film 2 at it. In step S4, when it judges whether there was any input of discharge of a film 2 of directions from a control panel 33 and there are directions of discharge of a film 2, it shifts to step S5, a film 2 is discharged from a cylinder 1, and this processing flow is ended.

[0023] When there are no discharge directions of a film 2, it shifts to step S6 from step S4. It waits for directions of the image recording from a system 60 at step S6. When it is judged that there were directions of the image recording from a system 60, it shifts to step S7 and the size x of the direction of vertical scanning of image data 1M and the size y of a main scanning direction are received from a system 60. At step S8, in stable-ranking (direction array of vertical scanning) processing (LAYOUT flag = "H"), the array direction of a record image is shifted to step S9 with reference to the LAYOUT flag of RAM31, in vertical list (main scanning direction array) processing (LAYOUT flag = "V"), it shifts to step S10, and it performs image recording. After these processings finish, it waits for return, discharge directions of a film, or directions of the following image recording to step S4.

[0024] The detail of the lining-up-side-by-side processing flow of step S9 is shown in drawing 6. First, a recording start location judges whether in which case of the following three cases, it corresponds at steps S21 and S22. these three cases -- \*\* -- the case where an image is recorded on the following film.

\*\* When an image is recorded on a different horizontal-scanning field from said image transcription image.

[0025] \*\* When an image is recorded on the same horizontal-scanning field as said image transcription image. coming out -- it is -- formula the case where  $Y_c + y > L_y$  is filled -- the case (step S21 is Yes) of \*\*, and formula  $Y_c + y \leq L_y$  -- and -- the case where  $X_c + x > L_x$  is filled -- the case (for step S21, No and step S22 are No) of \*\*, and formula  $Y_c + y \leq L_y$  -- and -- When filling  $X_c + x \leq L_x$ , it is judged as the case (step S22 is Yes) of \*\*, respectively. It is the coordinate location of the recording start point P at the time of assuming that an image is recorded on the horizontal-scanning field as the record image recorded last time where  $X_c$  and  $Y_c$  are the same here.

[0026] \*\* a case -- the present and a cylinder 1 -- equipping -- having -- \*\*\*\* -- a film -- two -- \*\*\*\* -- a free area -- being few -- since -- a degree -- in order to record on a film, shift to step S23 from step S21, discharge the film 2 with which the cylinder 1 is equipped, and equip a cylinder 1 with the new film 2 at step S24. Furthermore, at step S25, the recording start point P is changed into a zero, and step S26 performs image exposure. Next, at step S27, the following record image sets up X coordinate  $X_c$  of the recording start point P, assuming that it is recorded on the same horizontal-scanning field as the record image recorded at this step S26 (making  $X_c$  into  $x + \alpha$ ), and makes the main maximum coordinate  $Y_{max}$   $y + \beta$  further. However, Y coordinate  $Y_c$  of the recording start point P does not need to change.

[0027] \*\* a case -- last time -- recording -- having had -- record -- an image -- containing -- having -- horizontal scanning -- a field -- \*\*\*\* -- a free area -- being few -- since -- a degree -- in order to record on a horizontal-scanning field, shift to step S30 from step S22, set the recording start point P as a point (0  $Y_{max}$ ), and perform image exposure at step S31. Here, the main maximum coordinate  $Y_{max}$  is the value which added spacing beta to the maximum coordinate of the main scanning direction of the record image of a pre-horizontal-scanning field. Next, at step S32, the following image sets up X coordinate  $X_c$  of the recording start point P, assuming that it is recorded on the same horizontal-scanning field as the record image recorded at this step S31 ( $X_c$  is made into  $x + \alpha$ ), and makes the main maximum coordinate  $Y_{max}$   $Y_c + y + \beta$  further. However, it is not necessary to change Y coordinate  $Y_c$  of the recording start point P like the case of \*\*.

[0028] \*\* a case -- last time -- recording -- having had -- record -- an image -- containing -- having -- horizontal scanning -- a field -- being the same -- horizontal scanning -- a field -- recording -- a sake -- step S -- shift to step S28 from 22, and perform image exposure by making a coordinate ( $X_c$ ,  $Y_c$ ) into the recording start point P as it is. Next, X coordinate  $X_c$  of the following recording start point P is set up, assuming that it is

recorded on the same horizontal-scanning field as the record image with which the following image was recorded at this step S29 at step S29 ( $X_c$  is made into  $X_c + x + \alpha$ ), and what added spacing  $\beta$  to the maximum coordinate of a main scanning direction among all the record images of this horizontal-scanning field is further set up as the main maximum coordinate  $Y_{max}$ .

[0029] The detail of the vertical list processing flow of step S10 is shown in drawing 7. Vertical list processings are step S41 – step S52, perform processing of step S21 – step S32 lining up side-by-side, and same processing, and replace the X coordinate and Y coordinate in a lining-up-side-by-side processing flow. Here, a recording start location judges whether in which case of the following three cases, it corresponds at steps S41 and S42. these three cases -- \*\* -- the case where an image is recorded on the following film.

[0030] \*\* When an image is recorded on a different vertical-scanning field from said image transcription image.  
 \*\* When an image is recorded on the same vertical-scanning field as said image transcription image.  
 coming out -- it is -- formula the case where  $X_c + x > L_x$  is filled -- the case (step S41 is Yes) of \*\*, and formula  $X_c + x \leq L_x$  -- and -- the case where  $Y_c + y > L_y$  is filled -- the case (for step S41, No and step S42 are No) of \*\*, and formula  $X_c + x \leq L_x$  -- and -- When filling  $Y_c + y \leq L_y$ , it is judged as the case (step S42 is Yes) of \*\*, respectively.

[0031] \*\* a case -- step S -- shift to step S43 from 41, discharge the film 2 with which the cylinder 1 is equipped like the case of \*\* in a lining-up-side-by-side processing flow, and equip a cylinder 1 with the new film 2 at step S44. Furthermore, at step S45, the recording start point P is changed into a zero, and step S46 performs image exposure. Next, at step S47, the following image sets Y coordinate  $Y_c$  of the recording start point P as  $y + \beta$ , assuming that it is recorded on the same vertical-scanning field as the record image recorded at this step S46, and makes  $X_{max} + x + \alpha$  further. Here,  $X_{max}$  is equivalent to the main maximum coordinate  $Y_{max}$  at the time of processing lining up side-by-side, and calls the submaximum coordinate hereafter.

[0032] \*\* a case -- step S -- shift to step S50 from 42, set the recording start point P as a point ( $X_{max}$ , 0) like the case of \*\* in a lining-up-side-by-side processing flow, and perform image exposure at step S51. Here, the submaximum coordinate  $X_{max}$  is the value which added spacing  $\alpha$  to the maximum coordinate of the direction of vertical scanning of the record image of a pre-vertical-scanning field. Next, at step S52, the following image sets Y coordinate  $Y_c$  of the recording start point P as  $y + \beta$ , assuming that it is recorded on the same vertical-scanning field as the record image recorded at this step S51, and makes the submaximum coordinate  $X_{max} + x + \alpha$  further.

[0033] \*\* a case -- step S -- shift to step S48 from 42, and perform image exposure by making a coordinate ( $X_c$ ,  $Y_c$ ) into the recording start point P as it is like the case of \*\* in a lining-up-side-by-side processing flow. Next, at step S49, it assumes that the following image is recorded on the same vertical-scanning field, the coordinate ( $X_c$ ,  $Y_c$ ) of the recording start point P is set up, and what added spacing  $\alpha$  to the maximum coordinate of the direction of vertical scanning among the record images of this vertical-scanning field is further set up as the submaximum coordinate  $X_{max}$ .

---

[Translation done.]

\* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

DESCRIPTION OF DRAWINGS

---

[Brief Description of the Drawings]

[Drawing 1] The perspective view of the output machine for the platemaking as image recording equipment by one example of this invention.

[Drawing 2] The perspective illustration of the exposure section.

[Drawing 3] The control-block Fig. of an output machine.

[Drawing 4] Drawing explaining the allotment condition of two or more images.

[Drawing 5] The control flow chart of the Maine processing of CPU.

[Drawing 6] The control flow chart of processing lining up side-by-side.

[Drawing 7] The control flow chart of vertical list processing.

[Drawing 8] Drawing showing an example of the record size of two or more images.

[Drawing 9] The explanatory view when making an image into a vertical list.

[Drawing 10] The explanatory view when lining up an image side-by-side.

[Description of Notations]

30 CPU

33 Control Panel

50 Output Machine

53 Exposure Section

---

[Translation done.]

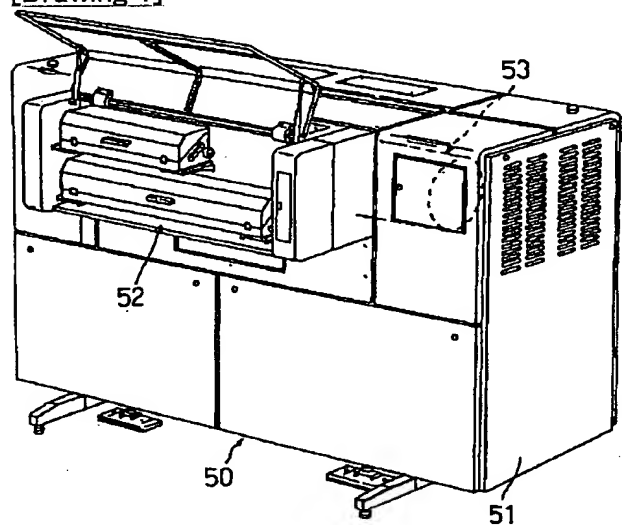
\* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

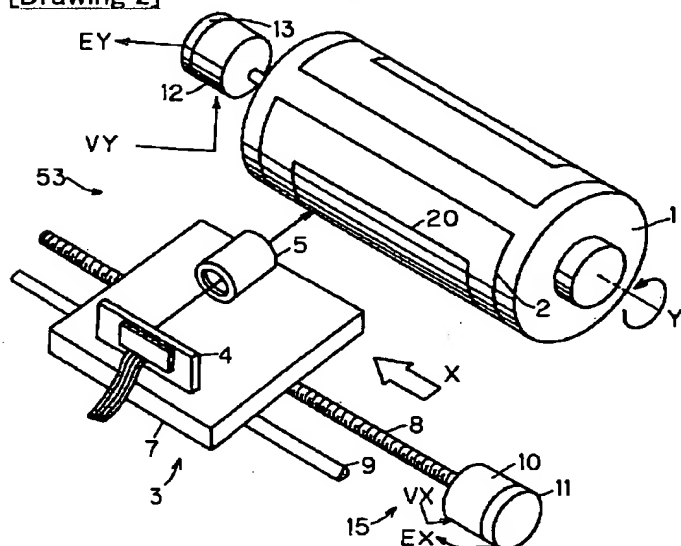
- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DRAWINGS

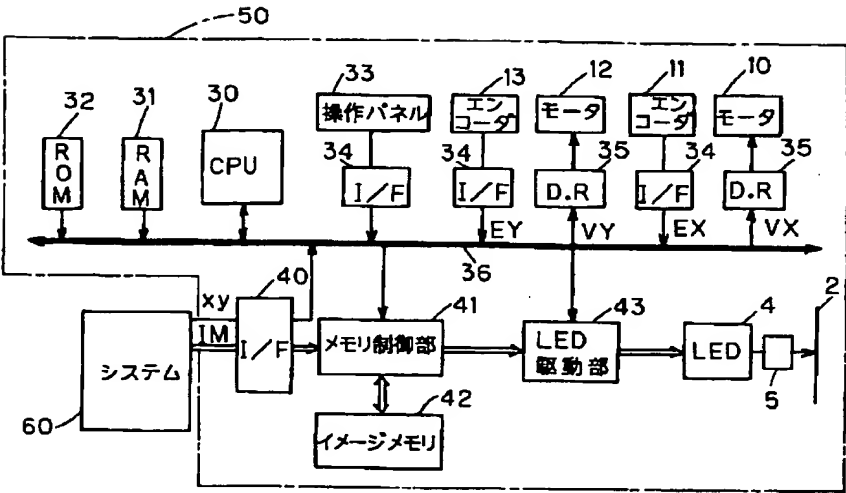
[Drawing 1]



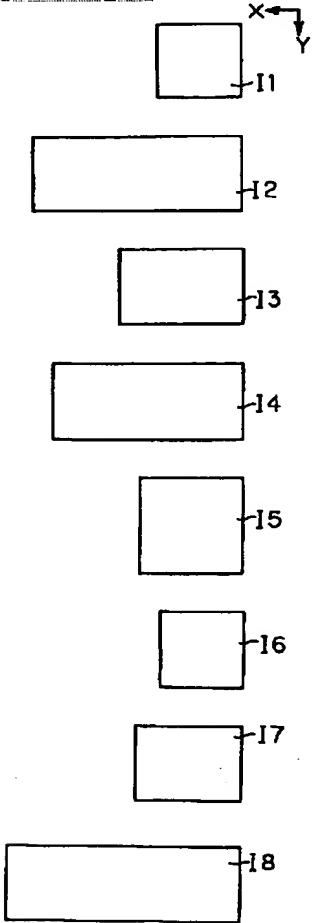
[Drawing 2]



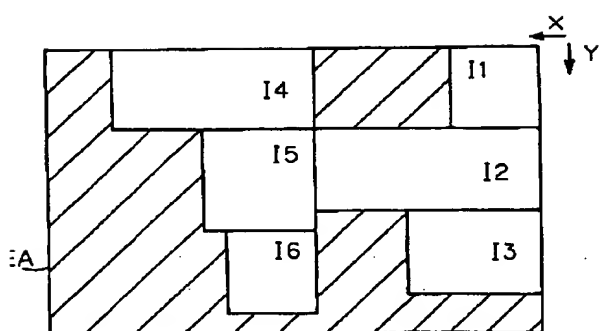
[Drawing 3]



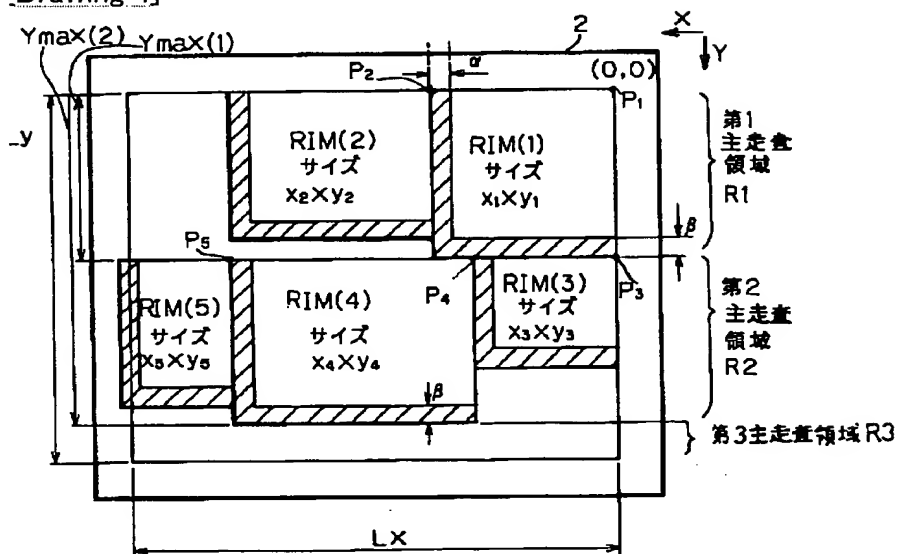
[Drawing 8]



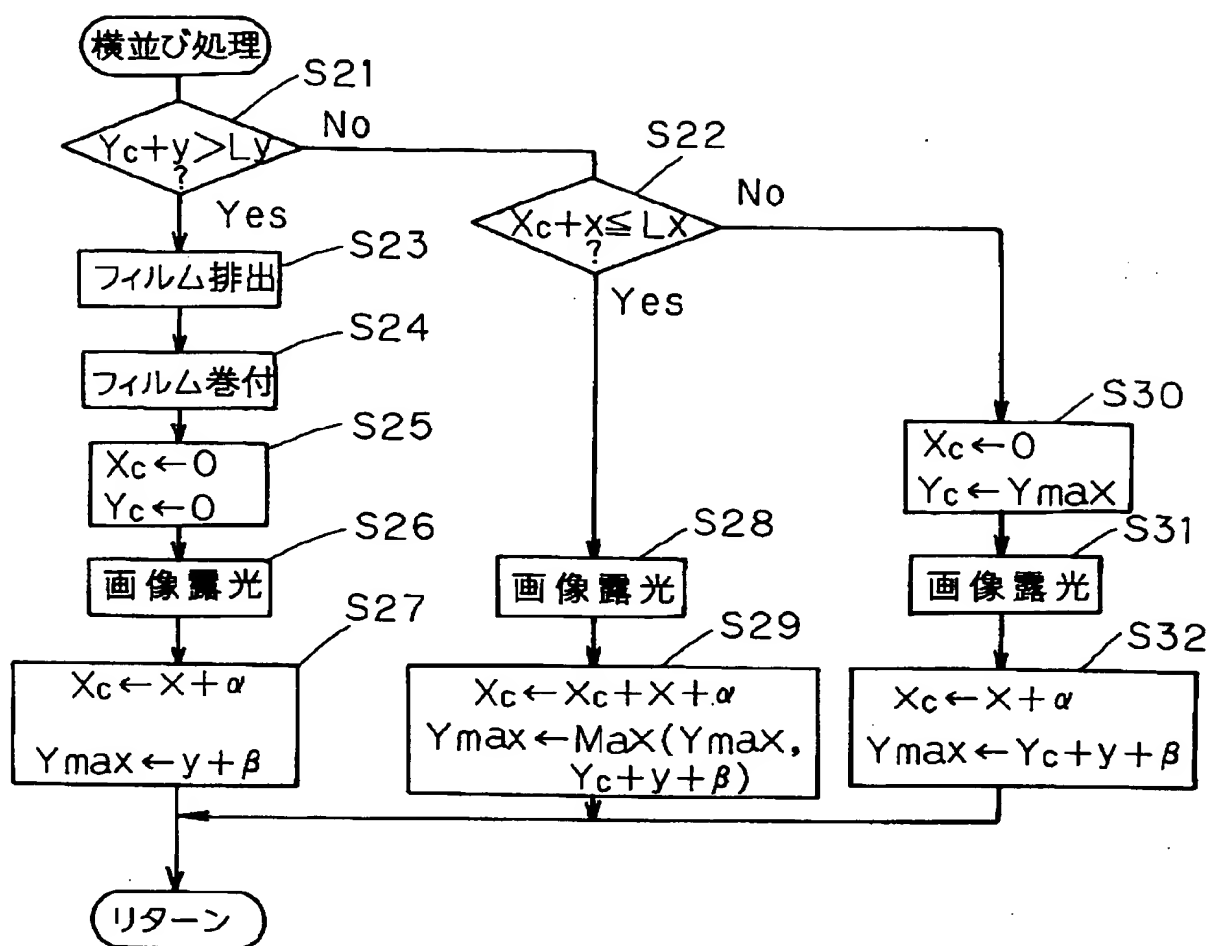
[Drawing 9]



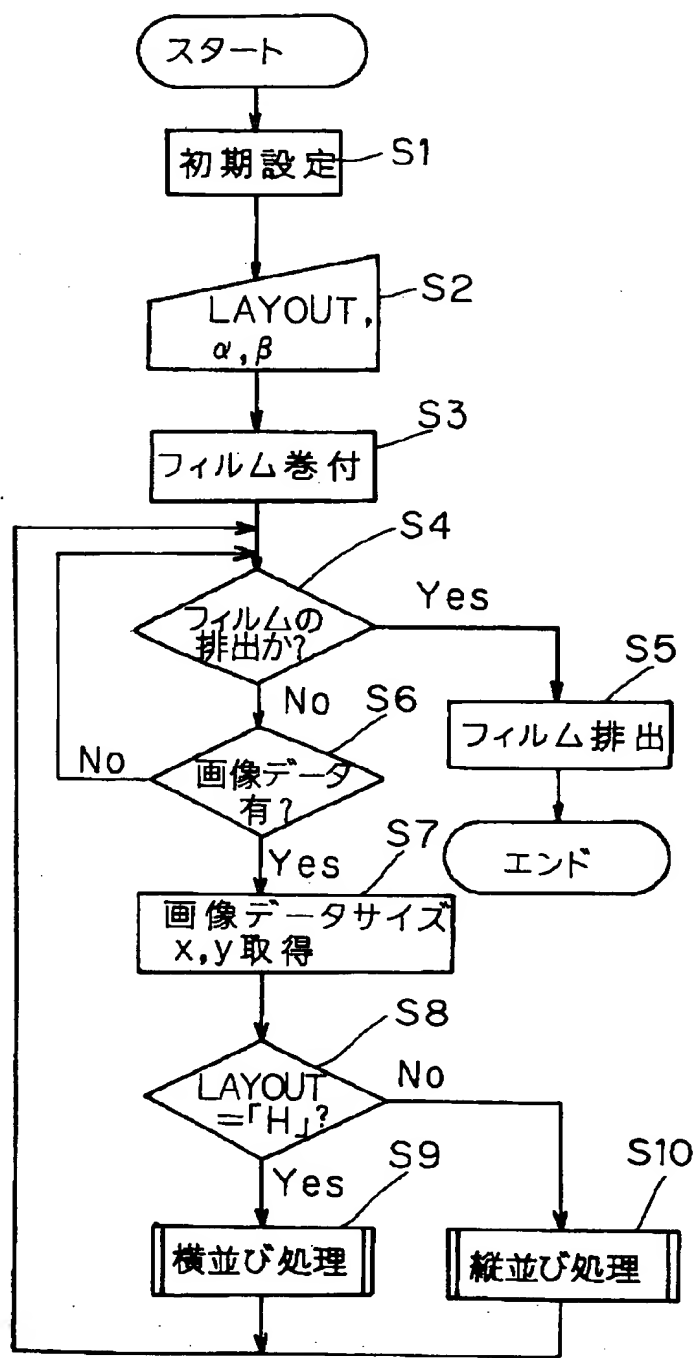
[Drawing 4]



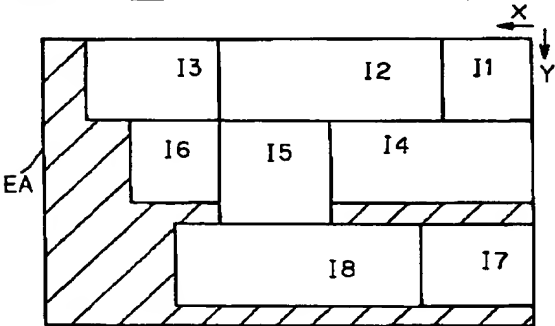
[Drawing 6]



[Drawing 5]

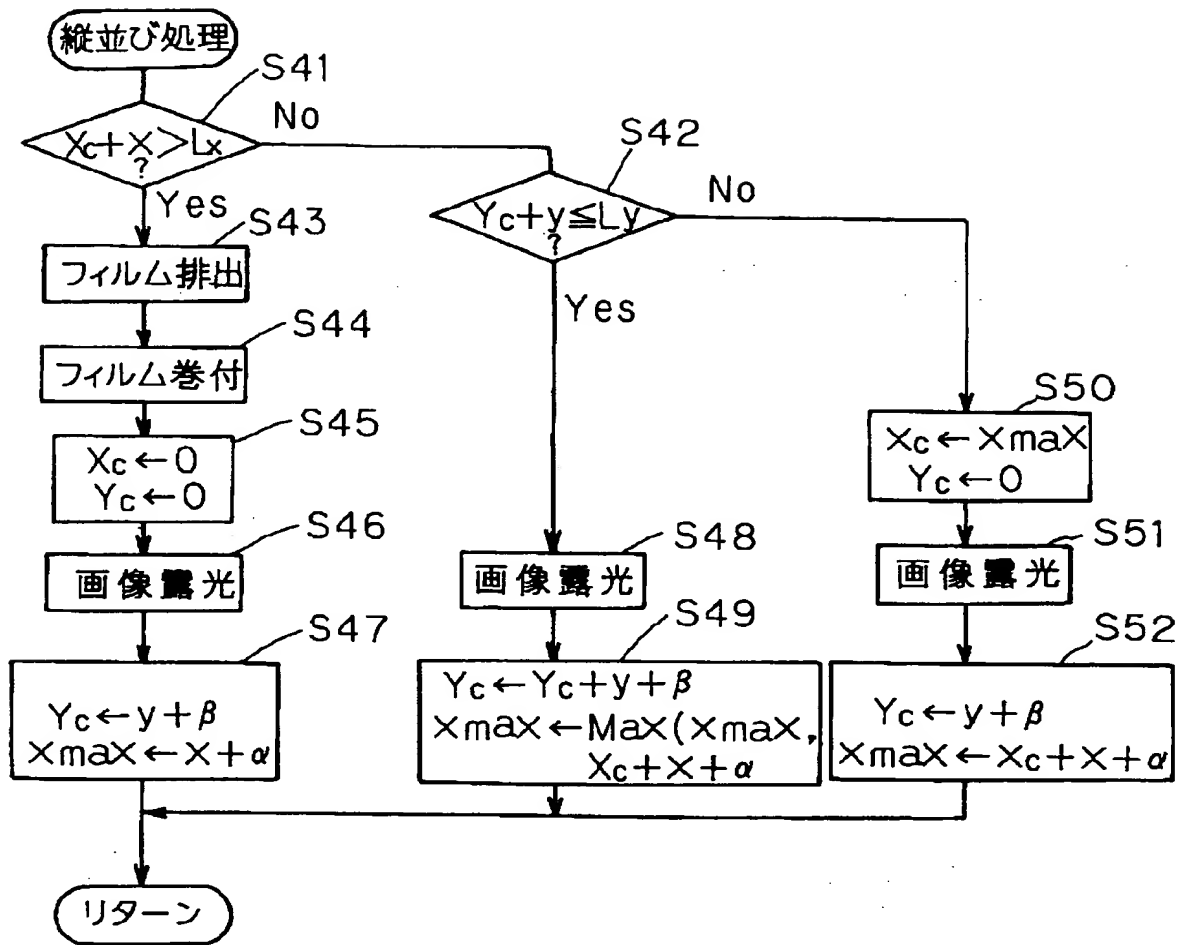


[Drawing 10]



[Drawing 7]





[Translation done.]

(19)日本国特許庁 (J P)

(12) 公 開 特 許 公 報 (A)

(11)特許出願公開番号

特開平6-313962

(43)公開日 平成6年(1994)11月8日

(51)Int.Cl.<sup>5</sup>

G 0 3 F 1/00  
H 0 4 N 1/387

識別記号

庁内整理番号

E 7369-2H  
4226-5C

F I

技術表示箇所

審査請求 未請求 請求項の数 1 O L (全 9 頁)

(21)出願番号 特願平5-102416

(22)出願日 平成5年(1993)4月28日

(71)出願人 000207551

大日本スクリーン製造株式会社  
京都府京都市上京区堀川通寺之内上る4丁  
目天神北町1番地の1

(72)発明者 光木 清臣

京都市南区東九条南石田町5番地 大日本  
スクリーン製造株式会社十条事業所内

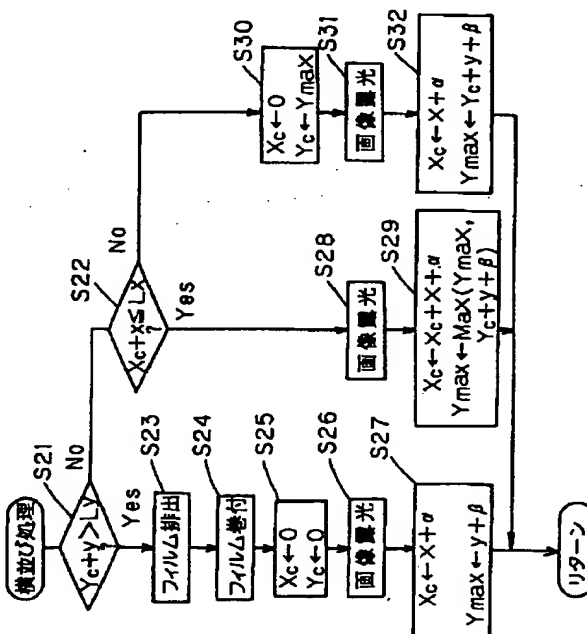
(74)代理人 弁理士 小野 由己男 (外1名)

(54)【発明の名称】 画像記録装置

(57)【要約】

【目的】 大きさが限定された記録媒体に複数の画像を空間効率よく記録できるようにする。

【構成】 出力機は、複数の画像を順次感光フィルムに記録する装置である。この装置では、操作パネルから画像の感光フィルム上での配列方向が指定されると、指定された配列方向（横並びまたは縦並び）と画像の記録サイズ（x, y）とにより画像の記録開始位置 P（Xc, Yc）が決定される。そして、露光部により、決定された記録開始位置から画像が記録される。



## 【特許請求の範囲】

【請求項1】複数の画像を順次記録媒体に記録する画像記録装置において、

前記画像の前記記録媒体上での配列方向を獲得する配列方向獲得手段と、

前記配列方向獲得手段によって得られた配列方向と、前記画像の記録サイズとにより各画像の記録開始位置を決定する開始位置決定手段と、

前記開始位置決定手段で決定された記録開始位置から前記画像を記録する記録手段と、を備えた画像記録装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は、画像記録装置、特に、複数の画像を順次記録媒体に記録する画像記録装置に関する。

## 【0002】

【従来の技術】イメージセッタや出力スキャナと称する製版用の画像記録装置は、記録媒体である感光フィルム（以下、単にフィルムと記す）に、複数の画像を順次露光記録する。この複数の画像は、記録サイズがまちまちであるため、複数の画像の記録サイズを考慮に入れて各画像の記録位置を決定しないと、画像形成されない領域が増え、その結果、フィルムの無駄な部分が多くなる。

【0003】そこで、画像記録装置に画像データを大量に記録できるメモリを設け、複数の画像データをそのメモリに一旦記憶し、そして、画像データの記録サイズによりそれら複数の画像の記録位置を決定し、その後、決定された記録位置にしたがって順次画像を記録することが考えられる。しかし、これでは、大容量のメモリが必要であり、また、複数の画像全てのサイズが分からないと記録位置を決定できないため記録開始までに長時間を要する。

【0004】このため、従来の画像記録装置では、フィルムの画像形成領域を一方に分割し、その分割領域に沿って順次複数の画像を配列して記録している。つまり、フィルムに対する記録画像の配列方向を固定して、その配列方向にそって順次画像を割りつけている。

## 【0005】

【発明が解決しようとする課題】しかし、従来の画像記録装置では、記録画像の配列方向が固定されていたため、画像の記録サイズによっては、画像形成されない未記録領域が増え、フィルムが無駄になる場合がある。たとえば、図8に示すように、複数の画像データI1～I8それぞれの一方（たとえば、主走査方向Y）の記録サイズがほぼ同一であり、他方向（たとえば、副走査方向X）のサイズがまちまちである場合、図9に示すように主走査方向Yに順次記録画像I1～I8を配列すると、フィルムの有効領域EAに対してハッチングで示す未記録領域が大きくなり、無駄な部分が多くなる。従って、6つの画像I1～I6しか1枚のフィルムに記録で

きず、残りの2つの画像I7～I8は、次のフィルムに記録しなければならない。このため、フィルムを無駄に消費する。

【0006】図8に示すようなサイズの画像を記録する場合は、図10に示すように、副走査方向Xに画像I1～I8を配列するほうが、ハッチングで示す未記録領域、つまり、フィルムの無駄な部分が少なくなり、全ての画像I1～I8を1枚のフィルムに記録できる。本発明の目的は、大きさが限定された記録媒体に複数の画像を記録する際に、記録媒体を無駄なく有効に使用できるようにすることにある。

## 【0007】

【課題を解決するための手段】本発明に係る画像記録装置は、複数の画像を順次記録媒体に記録する装置であって、配列方向獲得手段と開始位置決定手段と記録手段とを備えている。配列方向獲得手段は、画像の前記記録媒体上での配列方向を得るものである。開始位置決定手段は、配列方向獲得手段によって得られた配列方向と画像の記録サイズとにより画像の記録開始位置を決定するものである。記録手段は、開始位置決定手段で決定された記録開始位置から画像を記録するものである。

## 【0008】

【作用】本発明に係る画像記録装置では、複数の画像を順次記録媒体に記録する際に、配列方向獲得手段により画像の前記記録媒体上での配列方向が得られると、開始位置決定手段が、得られた配列方向と画像の記録サイズとにより画像の記録開始位置を決定する。そして、記録手段が開始位置決定手段で決定された記録開始位置から画像を記録する。

【0009】ここでは、画像の配列方向を得、得られた配列方向と画像の記録サイズとに応じて画像開始位置が定められ画像が記録媒体に記録されるので、大きさが限定された記録媒体に対して効率よく画像を配置でき、記録媒体の無駄な部分を少なくできる。

## 【0010】

## 【実施例】

## 画像記録装置の構成

図1は、本発明の一実施例による画像記録装置としての製版用の出力機50を示している。出力機50は、箱状の本体ケース51と、本体ケース51の背面側（図1手前側）に配置されたフィルム供給部52と、フィルム供給部52から供給されたフィルムを露光してフィルムに画像を記録する露光部53とを主に有している。

## 露光部の構成

露光部53は、図2に示すように、供給されたフィルム2を外周面に装着するシリンダ1と、シリンダ1を主走査方向Yに回転駆動するモータ12と、シリンダ1に保持されたフィルム2を画像データに応じた光で露光する露光ヘッド3と、露光ヘッド3を副走査方向Xに駆動するヘッド移動機構15とから構成されている。シリンダ

1とフィルム供給部52との間には、図示しないフィルム着脱機構が配置されている。フィルム着脱機構はシリンダ1へのフィルムの供給と排出とを行う。

【0011】露光ヘッド3は、複数の発光素子を有するLEDアレイ4と、LEDアレイ4の発光素子の像をフィルム2に結像するためのズームレンズ5と、LEDアレイ4及びズームレンズ5が固定されている移動台7とから構成されている。ヘッド移動機構15は、モータ10と、モータ10により回転駆動されるボールねじ8と、副走査方向Xに平行に配置された1対のレール9（一方のみ図示）と、移動台7に固定され、ボールねじ8に螺合するボールナット（図示せず）とから構成されている。移動機構15は、モータ10を駆動することにより露光ヘッド3を副走査方向Xに移動させる。

【0012】モータ10、12は、駆動信号VX、VYを受けて駆動制御され、また、それぞれに設けられたエンコーダ11、13からエンコーダ信号EX、EYを出力する。エンコーダ信号EX、EYは、それぞれ露光ヘッド3による露光位置のX座標、Y座標を示している。以上の構成により、モータ12よりシリンダ1が主走査方向Yへ回転し、モータ10により露光ヘッド3が副走査方向Xへ移動するとともに、LEDアレイ4を画像データに基づいて発光制御することにより、フィルム2の有効画像領域20に画像を露光することができる。なお、画像が露光されたフィルム2は、現像機（図示せず）により現像される。

#### 出力機の制御部の構成

図3に、出力機50の制御ブロック図を示す。

【0013】出力機50は、画像読取装置あるいは画像データベースからなるシステム60から出力される画像データIMをフィルム2に記録するものである。この画像データIMはラスタ形式で表現されている。また、出力機50とシステム60とはインターフェイス40を介して接続されている。出力機50は、制御用のCPU30を有している。CPU30には、システムバス36を介してRAM31、ROM32及びインターフェイス40が接続されており、CPU30は、RAM31に格納された各種データ及びROM32に格納されている制御プログラムに基づいて、各負荷を制御する。

【0014】なお、RAM31に格納されている各種データとは、操作パネル33から入力される記録画像の配列方向を示すLAYOUTフラグ（横並びのとき「H」、縦並びのとき「V」）、記録画像の副走査方向の間隔 $\alpha$ 、記録画像の主走査方向の間隔 $\beta$ 、記録開始位置座標P（ $X_c$ 、 $Y_c$ ）、及び露光ヘッド3の露光位置座標Q（ $X_h$ 、 $Y_h$ ）である。ここで、画像の配列方向は、オペレーターが、画像のサイズに応じて設定すればよく、複数の記録画像の主走査方向のサイズが揃っている場合は、副走査方向の配列を、一方、副走査方向のサイズが揃っていないときは副走査方向の配列を選択すればよい。

また、間隔 $\alpha$ 、間隔 $\beta$ は、1枚のフィルム2に記録された複数の画像をそれぞれ切り離すために必要な切りしろの間隔を示すもので、オペレーターにより可変に設定できる。また、記録開始点の座標Pは、後述する演算により設定され、露光位置座標Qは、エンコーダ11、13からのエンコーダ信号EX、EYにより常に検出されている。

【0015】CPU30が制御する各負荷は、システムバス36を介して接続されたメモリ制御部41及びLED駆動部43と、システムバス36及びそれぞれのドライバ35を介して接続されたモータ10、12とである。メモリ制御部41は、システム60からインターフェイス40を介して入力される画像データIMをイメージメモリ42に書き込むための制御と、イメージメモリ42から画像データIMを読み出してLED駆動部43に出力するための制御とを行う。LED駆動部42は、メモリ制御部41から出力される画像データIMに応じてLEDアレイ4の発光を制御するものである。また、CPU30には、それぞれのインターフェイス34及びシステムバス36を介して操作パネル33、エンコーダ11、13も接続されている。

【0016】このように、CPU30は、モータ10、12に駆動信号VX、VYをそれぞれ出力して、各モータ10、12を駆動制御し、また、メモリ制御部41及びLED駆動部43を制御する。

#### 概略動作

このような構成により、CPU30は、システム60から画像データの副走査方向のサイズx、及び主走査方向のサイズyを受け取ると、予め設定されている記録画像の配列方向とこのサイズx、yとにより画像の記録開始点Pを決定し、この記録開始点Pに露光ヘッド3の露光位置Qが位置するようにモータ10及び12を駆動する。そして、画像データIMに基づいてLEDアレイ4を発光制御して決定された位置に画像を露光する。

#### 記録画像の割り付け

図4に、記録サイズの異なる複数の画像を副走査方向Xに配列して記録する場合の割り付け例を示す。

【0017】ここで、システム60から順次出力される複数の画像の画像データをIM(n)（ただし、 $n=1, 2, \dots$ ）、画像データIM(n)の副走査方向のサイズを $x_n$ 、主走査方向のサイズを $y_n$ 、フィルム2の有効画像領域の副走査方向のサイズを $L_x$ 、主走査方向のサイズを $L_y$ 、隣接する記録画像の副走査方向の間隔を $\alpha$ 、隣接する記録画像の主走査方向の間隔を $\beta$ とする。

【0018】画像データIM(1)に基づく記録画像RIM(1)は、原点(0, 0)を記録開始点 $P_1$ とした領域に露光される。次の画像データIM(2)に基づく記録画像RIM(2)は、記録開始点 $P_2$ で示される領域に露光されるのであるが、ここで、記録開始点 $P_2$ の

Y座標は、記録開始点 $P_1$ と同じであり、X座標は、画像データIM(1)の副走査方向Xのサイズ $x_1$ に間隔 $\alpha$ を加算した座標分シフトした点である。すなわち、  
 $P_2 : (x_1 + \alpha, 0)$

となる。この結果、記録画像RIM(1)と記録画像RIM(2)の副走査方向Xの間隔は、距離 $\alpha$ だけ離れる。

【0019】次に、画像データIM(3)に基づく記録画像RIM(3)は、第1主走査領域R1の空き領域が小さいので、次の第2主走査領域R2に記録される。ここで、第 $m$ 主走査領域 $R_m$ ( $m$ は正の整数)とは、記録開始点 $P$ の主走査方向Yの座標が同じ記録画像が形成され、副走査方向に平行な分割線で分割される領域であり、図4の場合、第1主走査領域R1は、記録画像RIM(1)及びRIM(2)を含み、また、第2主走査領域R2は、記録画像RIM(3)、RIM(4)及びRIM(5)を含む領域である。したがって、記録開始点 $P_3$ は、

$P_3 : (0, Y_{max}(1)) = (0, y_1 + \beta)$

ここで、 $Y_{max}(1)$ とは、第1主走査領域R1に記録された全記録画像領域における主走査方向の最大座標に間隔 $\beta$ を加算したものであり、以下、主最大座標と称す。これは、第1主走査領域R1と第2主走査領域R2の記録画像との間に少なくとも間隔 $\beta$ を空けるためである。

【0020】以下、同様にして、画像データIM(4)、IM(5)の画像データの記録開始点 $P_4$ 、 $P_5$ は、

$P_4 : (x_3 + \alpha, y_1 + \beta)$

$P_5 : (x_3 + x_4 + 2 \cdot \alpha, y_1 + \beta)$

となる。さらに、画像データIM(6)をこのフィルム2に記録する場合、

$L_y - Y_{max}(2) \geq y_6$

の式を満たせば第3主走査領域R3に記録可能であるが、満たされなければ有効画像領域内に記録することはできないので、新たなフィルム2に記録する。

#### 処理フロー

図5に、本発明の一実施例に係る処理フローを示す。この処理フローは、ROM32に格納されている制御プログラムの内容を示すものである。

【0021】まず、ステップS1で、初期設定を行う。ここでは、LAYOUTフラグが「横並び(H)」に、露光ヘッド3及びシリンダ1が原点に配置される。また、記録開始点 $P(X_c, Y_c)$ は原点(0, 0)に設定される。ステップS2では、操作パネル33から入力された、隣接する記録画像間の副走査方向Xの間隔 $\alpha$ 、主走査方向Yの間隔 $\beta$ 及び記録画像の配列方向(LAYOUT)を受け付け、受け付けたデータをRAM31に格納する。

【0022】ステップS3では、フィルム供給部52及

びフィルム着脱機構を制御し、フィルム2をシリンダ1に装着する。ステップS4では、操作パネル33からフィルム2の排出の指示の入力があったか否かを判断し、フィルム2の排出の指示があった場合は、ステップS5に移行し、フィルム2をシリンダ1から排出してこの処理フローを終了する。

【0023】フィルム2の排出指示がなかった場合はステップS4からステップS6に移行する。ステップS6では、システム60からの画像記録の指示を待つ。システム60からの画像記録の指示があったと判断した場合は、ステップS7に移行し、システム60から画像データIMの副走査方向のサイズ $x$ 及び主走査方向のサイズ $y$ を受け取る。ステップS8では、記録画像の配列方向をRAM31のLAYOUTフラグを参照し、横並び(副走査方向配列)処理の場合(LAYOUTフラグ=「H」)はステップS9に移行し、縦並び(主走査方向配列)処理の場合(LAYOUTフラグ=「V」)はステップS10に移行し、画像記録を行う。これらの処理が終わると、ステップS4に戻り、フィルムの排出指示、または、次の画像記録の指示を待つ。

【0024】図6にステップS9の横並び処理フローの詳細を示す。まず、ステップS21及びS22で、記録開始位置が、次の3つのケースのどの場合に相当するかを判断する。この3つのケースとは、

- ①次のフィルムに画像を記録する場合。
- ②前記録画像と異なる主走査領域に画像を記録する場合。

【0025】③前記録画像と同一の主走査領域に画像を記録する場合。

であり、式  $Y_c + y > L_y$  を満たす場合、①のケース(ステップS21がYes)、式  $Y_c + y \leq L_y$  かつ  $X_c + x > L_x$  を満たす場合、②のケース(ステップS21がNoかつステップS22がNo)、式  $Y_c + y \leq L_y$  かつ  $X_c + x \leq L_x$  を満たす場合、③のケース(ステップS22がYes)、とそれぞれ判断する。ここで、 $X_c$ 、 $Y_c$ とは、前回記録した記録画像と同一の主走査領域に画像を記録すると仮定した場合の記録開始点 $P$ の座標位置である。

【0026】①の場合、現在、シリンダ1に装着されているフィルム2には、空き領域が少ないので、次のフィルムに記録するため、ステップS21からステップS23に移行し、シリンダ1に装着されているフィルム2を排出し、ステップS24で新たなフィルム2をシリンダ1に装着する。さらに、ステップS25では、記録開始点 $P$ を原点に変更し、ステップS26で画像露光を行う。次にステップS27では、次の記録画像が今回のステップS26で記録された記録画像と同一の主走査領域に記録されると仮定して記録開始点 $P$ のX座標 $X_c$ を設定し( $X_c$ を $x + \alpha$ とし)、さらに、主最大座標 $Y_{max}$ を $y + \beta$ とする。ただし、記録開始点 $P$ のY座標 $Y_c$

は、変更する必要がない。

【0027】②の場合、前回記録された記録画像が含まれる主走査領域には空き領域が少ないので、次の主走査領域に記録するためステップS22からステップS30に移行し、記録開始点Pを点(0, Y<sub>max</sub>)に設定し、ステップS31で画像露光を行う。ここで、主最大座標Y<sub>max</sub>は、前主走査領域の記録画像の主走査方向の最大座標に間隔βを加算した値である。次にステップS32で、次の画像が今回のステップS31で記録された記録画像と同一の主走査領域に記録されると仮定して記録開始点PのX座標X<sub>c</sub>を設定し(X<sub>c</sub>をx+αとする)、さらに、主最大座標Y<sub>max</sub>をY<sub>c</sub>+y+βとする。ただし、記録開始点PのY座標Y<sub>c</sub>は、①のケースと同様に変更する必要がない。

【0028】③の場合、前回記録された記録画像が含まれる主走査領域と同一の主走査領域に記録するため、ステップS22からステップS28に移行し、座標(X<sub>c</sub>, Y<sub>c</sub>)をそのまま記録開始点Pとして画像露光を行う。次にステップS29で、次の画像が今回のステップS29で記録された記録画像と同一の主走査領域に記録されると仮定して次の記録開始点PのX座標X<sub>c</sub>を設定し(X<sub>c</sub>をX<sub>c</sub>+x+αとする)、さらに、主最大座標Y<sub>max</sub>として、この主走査領域の全記録画像のうち主走査方向の最大座標に間隔βを加算したものを設定する。

【0029】図7にステップS10の縦並び処理フローの詳細を示す。縦並び処理は、ステップS41～ステップS52で、ステップS21～ステップS32の横並び処理と同様の処理を行うものであり、横並び処理フローにおけるX座標とY座標とを入れ換えたものである。ここでは、ステップS41及びS42で、記録開始位置が、次の3つのケースのどの場合に相当するかを判断する。この3つのケースとは、

④次のフィルムに画像を記録する場合。

【0030】⑤前記録画像と異なる副走査領域に画像を記録する場合。

⑥前記録画像と同一の副走査領域に画像を記録する場合。

であり、式  $X_c + x > L_x$  を満たす場合、④のケース(ステップS41がYes)、式  $X_c + x \leq L_x$  かつ  $Y_c + y > L_y$  を満たす場合、⑤のケース(ステップS41がNoかつステップS42がNo)、式  $X_c + x \leq L_x$  かつ  $Y_c + y \leq L_y$  を満たす場合、⑥のケース(ステップS42がYes)、とそれぞれ判断する。

【0031】④の場合、ステップS41からステップS43に移行し、横並び処理フローにおける①のケースと同様にシリンダ1に装着されているフィルム2を排出し、ステップS44で新たなフィルム2をシリンダ1に装着する。さらに、ステップS45では、記録開始点Pを原点に変更し、ステップS46で画像露光を行う。次

にステップS47では、次の画像が今回のステップS46で記録された記録画像と同一の副走査領域に記録されると仮定して記録開始点PのY座標Y<sub>c</sub>をy+βに設定し、さらに、X<sub>max</sub>をx+αとする。ここで、X<sub>max</sub>は、横並び処理時における主最大座標Y<sub>max</sub>に相当するもので、以下、副最大座標と称す。

【0032】⑤の場合、ステップS42からステップS50に移行し、横並び処理フローにおける②のケースと同様に記録開始点Pを点(X<sub>max</sub>, 0)に設定し、ステップS51で画像露光を行う。ここで、副最大座標X<sub>max</sub>は、前副走査領域の記録画像の副走査方向の最大座標に間隔αを加算した値である。次にステップS52で、次の画像が今回のステップS51で記録された記録画像と同一の副走査領域に記録されると仮定して記録開始点PのY座標Y<sub>c</sub>をy+βに設定し、さらに、副最大座標X<sub>max</sub>をX<sub>c</sub>+x+αとする。

【0033】⑥の場合、ステップS42からステップS48に移行し、横並び処理フローにおける③のケースと同様に座標(X<sub>c</sub>, Y<sub>c</sub>)をそのまま記録開始点Pとして画像露光を行う。次にステップS49で、次の画像が同一副走査領域に記録されると仮定して記録開始点Pの座標(X<sub>c</sub>, Y<sub>c</sub>)を設定し、さらに、副最大座標X<sub>max</sub>として、この副走査領域の記録画像のうち副走査方向の最大座標に間隔αを加算したものを設定する。〔他の実施例〕前記実施例では、製版用の出力機に本発明を適用したが、複数の画像を記録するプリント基板のマスクパターン用の画像出力装置等の他の画像記録装置にも本発明を適用できる。

【0034】

【発明の効果】以上説明したとおり、本発明に係る画像記録装置では、画像の配列方向を得、得られた配列方向と画像の記録サイズとに応じて画像開始位置が定められ画像が記録媒体に記録されるので、大きさが限定された記録媒体に対して無駄なく画像を記録できる。

【図面の簡単な説明】

【図1】本発明の一実施例による画像記録装置としての製版用の出力機の斜視図。

【図2】露光部の斜視模式図。

【図3】出力機の制御ブロック図。

【図4】複数の画像の割り付け状態を説明する図。

【図5】CPUのメイン処理の制御フローチャート。

【図6】横並び処理の制御フローチャート。

【図7】縦並び処理の制御フローチャート。

【図8】複数の画像の記録サイズの一例を示す図。

【図9】画像を縦並びにしたときの説明図。

【図10】画像を横並びにしたときの説明図。

【符号の説明】

30 CPU

33 操作パネル

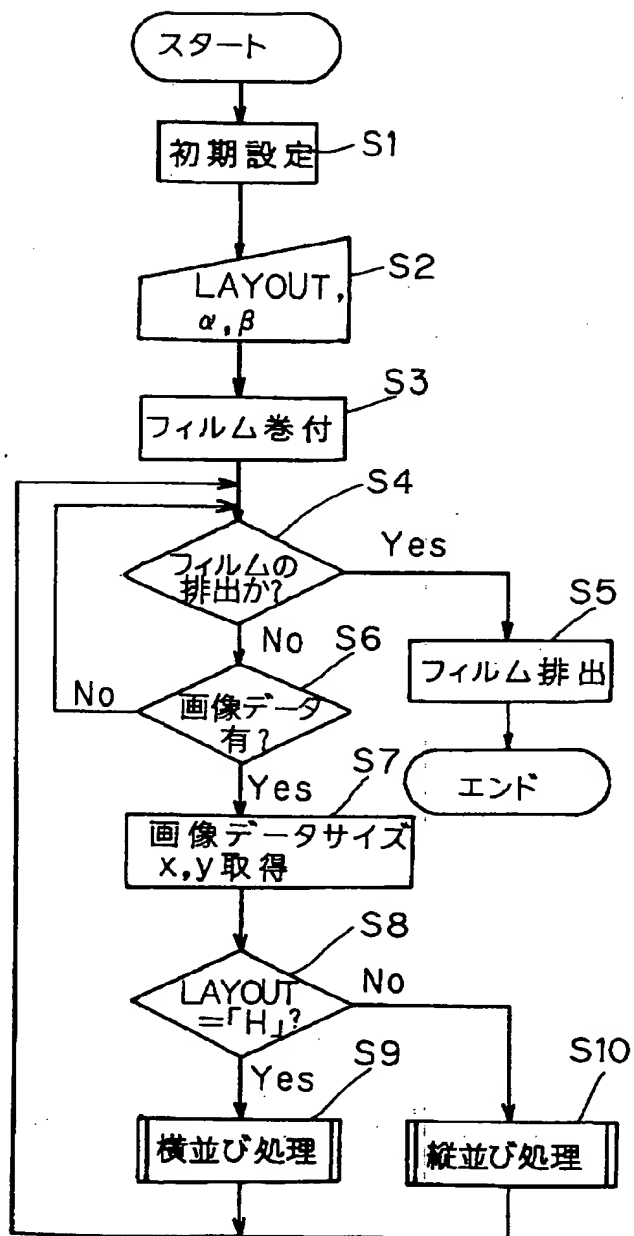
50 出力機



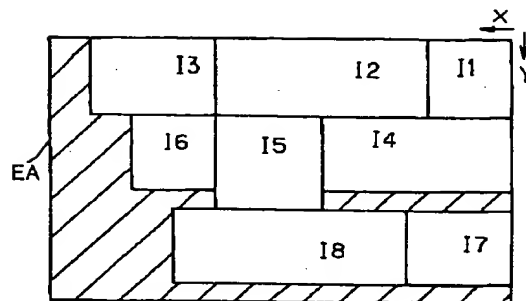




【図5】



【図10】



【図7】

